CHAPTER 24

MOTOR GENERATORS

24-1. Minimum maintenance activities for motor generators

The table located at the end of this chapter indicates items that must be performed to maintain systems and equipment at a minimum level of operational readiness. The listed minimum action items should be supplemented by manufacturer-recommended maintenance activities and procedures for specific pieces of equipment.

24-2. General maintenance procedures for motor generators

This section covers the inspection and tests required for general maintenance. Maintenance actions included in this chapter are summarized in table 24-1.

a. Review maintenance records. Personnel should review past maintenance records to find repair patterns. These records may point to certain components that should be closely inspected during performance of preventive maintenance.

b. Review operator records. Review operator records concerning electrical load connected to the motor generators and compare with equipment ratings. Operator records regarding lubrication and operating temperatures should also be reviewed.

c. Equipment inspection. Perform a general inspection of the motor generator as described below.

(1) Inspect to ensure that warning signs exist. Replace as required.

(2) Inspect enclosure for damage, unauthorized openings, and corrosion of metallic objects. Repair and paint as required.

(3) Inspect air passages and remove any blockage.

(4) Inspect, investigate, and solve conditions for unusual odors.

(5) As equipment is operated and tested, listen, investigate, and solve conditions for unusual noises.

(6) Inspect electrical connections for degradation. Repair as required.

(7) Inspect electrical insulation for discoloration and degradation. Repair as required.

(8) Inspect equipment grounding components such as conductors and connections. Repair as required.

(9) Inspect locking devices. Repair as required.

d. Clean equipment. Remove debris, dirt, and other foreign deposits from all components and areas of the motor generator set.

e. Tighten electrical connections. All electrical connections should be torqued to the proper design value.

f. Insulation test. Test motor and generator insulation as described below.

(1) Perform insulation resistance tests using a megohmmeter in accordance with Institute of Electrical and Electronic Engineers (IEEE) 43, Recommended Practice of Testing Insulation Resistance of Rotating Machinery, on the stator and rotor of motor, generator, and exciter.

(2) Perform dielectric absorption testing using a megohmmeter.

g. Verify equipment grounding. Verify the grounding of the equipment and associated neutral if applicable.

h. Infrared test. Test all main current carrying equipment for hot spots that may indicate overload conditions or loose connections.

i. Load test generator. Standby motor generators should be load tested for at least 30 minutes after the unit reaches stable operating temperature. Load testing should be executed after any maintenance has been performed.

(1) Verify frequency and voltage output.

(2) Verify instrumentation for correct indications.

j. Inspect bearings. Motor generator set bearings require routine maintenance to ensure reliable operation.

(1) Inspect bearings.

(2) Verify bearings are properly lubricated per manufacturers' recommendation.

(3) Perform vibration tests.

(4) Check alignment and couplings.

k. Measure and record neutral current. Using a true rms ammeter, measure the neutral current while generator is operating with site load. If amperage is abnormal, investigate for load imbalances and harmonics.

l. Verify system controls. Motor generator controls shall be calibrated and tested as described below.

(1) Using calibrated test instruments, calibrate ammeters, voltmeters, etc.

(2) Verify continuity of metering selector switch contacts with ohmmeter.

(3) Run controller diagnostics if the motor generator set is provided with such.

(4) Simulate automatic and manual control sequences. Because of the complexity, number of, and variety of sequences, it is not within the scope of this manual to describe specific tests. Simulation of control sequences should be all-inclusive to the extent that personnel are confident the control system will respond correctly should an actual similar event occur.

(5) Verify alarms. Actuate each alarm input for the correct response. Use corrective measures as required.

Table 24-1. Motor generators

Motor Generators	
Action	***Frequency***
WARNING! MAINTENANCE PERSONNEL SHALL LOCKOUT/TAG EQUIPMENT TO ENSURE DE-ENERGIZATION DURING MAINTENANCE PROCEDURES.	
Review maintenance records.	yr
Review operator records.	yr
Inspect motor generator sets for the following.	
Inspect to ensure that warning signs exist. Replace as required.	yr
Inspect enclosure for damage, unauthorized openings, and corrosion of metallic objects. Repair and paint as required.	yr
Inspect air passages and remove any blockage.	yr
Inspect, investigate, and solve conditions for unusual odors.	yr
As equipment is operated and tested, listen, investigate, and solve conditions for unusual noises.	yr
Inspect electrical connections for degradation. Repair as required.	yr
Inspect electrical insulation of discoloration and degradation. Repair as required.	yr
Inspect equipment grounding components such as conductors and connections. Repair as required.	yr
Inspect locking devices. Repair as required.	yr
Clean equipment.	yr
Tighten electrical connections.	yr
Test motor and generator insulation.	
Perform insulation resistance tests using a megohmmeter in accordance with IEEE 43 on the stator and rotor of motor, generator, and exciter.	yr
Perform dielectric absorption testing using a megohmmeter.	yr
Verify equipment grounding.	yr
Perform infrared test.	yr
Load test generator.	
Verify frequency and voltage output.	yr[1]
Verify instrumentation for correct indications.	yr[1]

[1]Or after any maintenance work.

Table 24-1. Motor generators (continued)

Motor Generators	
Action	***Frequency***
Inspect bearings.	
Verify bearings are properly lubricated per manufacturers' recommendation.	yr
Perform vibration tests.	yr
Check alignment and couplings.	yr
Measure and record neutral current.	yr
Verify system controls.	
Using calibrated test instruments, calibrate ammeters, voltmeters, etc.	yr
Verify continuity of metering selector switch contacts with ohmmeter.	yr
Run controller diagnostics if the MG set is provided with such.	yr
Simulate automatic and manual control sequences.	yr
Verify alarms.	yr